Glossary

acequias - Communal ditch systems developed to provide water to subsistence farmers in New Mexico.

aggregate - An aggregate is many soil particles held together in a small mass.

aggregate stability - A measure of how resistant aggregates are to destruction. A "well-aggregated soil" has a variety of sizes of aggregates and pores, and the aggregates hold up well to forces such as rain, wind, and compaction.

alluvium - Clay, silt, sand, gravel, or other particulate material that has been deposited by a stream or other body of running water in a streambed, on a flood plain, on a delta, or at the base of a mountain.

Alternative Futures Analysis - An assessment approach designed to inform community decisions regarding land and water use. Alternative land use scenarios are devised and applied to entire landscapes at varying extents of space and time.

Anasazi - A culture that existed in the American Southwest from about 700 AD until the mid-1200's. Peoples of this culture were among the earliest farmers in what is now the United States. They traditionally grew maize, beans, and squash and lived in towns of terraced stone, in cliff dwellings, and later, in adobe apartment blocks built around central plazas.

appropriation doctrine - The system for allocating water to private individuals used in most Western states. The doctrine of Prior Appropriation was in common use throughout the arid west as early settlers and miners began to develop the land. The prior appropriation doctrine is based on the concept of "First in Time, First in Right." The first person to take a quantity of water and put it to beneficial use has a higher priority of right than a subsequent user. Under drought conditions, higher priority users are satisfied before junior users receive water. Appropriative rights can be lost through nonuse; they can also be sold or transferred apart from the land. Contrasts with Riparian Water Rights.

area-sensitive species - Species that require large areas to persist, either because of body size, movement requirements, or specialized needs.

artificial recharge - A process where water is put back into ground-water storage from surface-water supplies such as irrigation, or induced infiltration from streams or wells.

assessing soil quality - Estimating the functional status of soil by comparing a soil to a standard such as an ecological site description, a similar soil under native vegetation, or a reference soil condition. (Compare to ***monitoring***.)

base flow - Streamflow coming from ground-water seepage into a stream.

baseline - The initial soil condition before monitoring soil quality over time. Subsequent measurements on the same soil are compared to the baseline measurement.

benchmark soil - A benchmark soil is one of large extent, holds a key position in the soil classification system, or is of special significance to farming, engineering, forestry, or other uses. The purpose of benchmark soils is to focus research efforts on soils that have the greatest potential for expansion of data and interpretations.

biodiversity - The variety of living organisms considered at all levels from genetic through species to higher taxonomic levels to ecosystems and landscape levels.

Cahokia - A pre-historic city of the Mississippian culture, built in what is now Illinois, across the Mississippi River from current-day St. Louis.

channelization - Simplification of stream and river channels by straightening channels, smoothing streambeds, and grading banks to remove resistance to flow and route water more rapidly along stream valleys. Reducing the resistance to flow through channelization increases the erosive energy of streamflow and alters channel dynamics in adjacent reaches (areas upstream and downstream).

collector-filterer - Organisms that consume their food by filtering small particles out of the water column without changing the size of the particles. These animals often spin fine nets (e.g., filtering caddisflies) or have filter-like appendages (e.g., blackflies).

collector-gatherer - Organisms that consume their food by sweeping up small particles into their mouths without changing the size of the particles. These animals often have brush-like mandibles.

columnar - A type of soil structure where the soil peds (or chunks) are in the shape of a column.

community - Any grouping of populations of different organisms that live together in a particular environment.

concretion - A nodule composed of concentrated chemicals in a soil (e.g., iron oxides, manganese oxides, calcium carbonates).

condensation - The process of water vapor in the air turning into liquid water. Water drops on the outside of a cold glass of water are condensed water. Condensation is the opposite process of evaporation.

connectivity - Connection of specific landscape features or habitat types across landscapes or along river networks. Permeability describes the ability of organisms or material to move through landscape features and determines the degree of connectivity or the consequences of fragmentation.

consumptive use - That part of water withdrawn that is evaporated, transpired by plants, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment. Also referred to as water consumed.

cubic feet per second (cfs) - A rate of flow. It is equal to a volume of water one foot high and one foot wide flowing a distance of one foot in one second. One cfs is equal to 7.48 gallons of water flowing each second. As an example, if your car's gas tank is 2 feet by 1 foot by 1 foot (2 cubic feet), then gas flowing at a rate of 1 cubic foot/second would fill the tank in two seconds.

cultural ecology - The interactions of people and the places they inhabit.

decomposers - Organisms that consume or breakdown dead organic matter.

discharge - The volume of water that passes a given location within a given period of time. Usually expressed in cubic feet per second.

dispersal-sensitive species - Those species whose fitness (ability to survive and reproduce) decreases in fragmented landscapes, due to physical, behavioral, and physiological limitations; or experience elevated mortality rates from having to cross human-dominated landscapes.

dissection or internal fragmentation - Occurs when linear or curvilinear corridors (e.g., roads, powerlines, trails) dissect an area.

dissolution - Soils, among other compounds, start dissolving into smaller units when placed in contact with water.

disturbance - Any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.

disturbance regime - The general pattern of occurrence of a disturbance in a given ecosystem. This pattern is defined by the frequency, magnitude and intensity of the disturbance.

drainage basin - Land area where precipitation runs off into streams, rivers, lakes, and reservoirs. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large drainage basins, like the area that drains into the Mississippi River contain thousands of smaller drainage basins. Also called a "watershed."

dynamic soil properties - Soil properties that change with use, management, natural disturbances, and natural cycles (e.g. seasonal, diurnal), and that are important for characterizing soil functions and ecological processes and for predicting soil behavior.

ecological processes - Processes of organisms, populations, communities, or ecosystems that involve the interactions of organisms (e.g., photosynthesis, decomposition, nitrogen uptake, competition, succession) or the transformation of energy, nutrients, or matter.

The ***ecological process*** approach to managing for species communities focuses on managing for ecological processes in such a way that falls within the natural range of historic variability. This includes ecological processes such as flooding, fire, herbivory, and predator-prey dynamics.

ecological restoration - The return of ecosystem structure and function that was altered or degraded by human activity. This generally involves re-establishing attributes or features of ecosystem as closely as possible to their pre-degraded condition.

ecosystem - A biological community together with its physical environment.

edge effect - Occurs when certain species are adversely affected by a specific set of circumstances; e.g., human factors such as poaching or abiotic factors such as elevated temperatures, associated with habitat edges.

edge-generalist species - Species whose fitness is enhanced near habitat edges.

edge-sensitive species - Species that have reduced fitness (ability to survive and reproduce) near habitat edges.

effervescence - The bubbling action that occurs as a gas comes out of a liquid.

electrical conductivity (EC) - How well the soil conducts an electrical charge. EC is a measure of salinity.

eluviation - The removal of materials in one horizon which are then "illuviated" or deposited in a lower horizon.

environmental stressor - An environmental factor, such as drought, which decreases the primary productivity of plants.

eutrophic - A system with high nutrient supply and low rates of primary production.

evolutionary significant unit (ESU) - A group of organisms that shares evolutionary lineage and contains the potential for a unique evolutionary future.

feeding function group - Classification of organisms based on *how* they consume their food.

flood pulse concept - A concept that describes the influence of flood processes on stream ecosystems. Periodic inundation results in shifts of energy flow and nutrient dynamics in the aquatic-terrestrial transition zone. Processes of organic inputs, nutrient flux, consumption, and transformation in both aquatic and terrestrial ecosystems are strongly influenced by these sharp gradients of environmental and ecological conditions along the flooded ecotone.

floodplain - 1) A fluvial geomorphic surface created by the deposition of alluvial sediments adjacent to the active channel of a stream or river; 2) the area on one or both sides of the river or stream channel that is inundated by floodwaters at some interval, from frequent to rare.

flux - The longitudinal transport of nutrients. Flux equals the standing stock of a nutrient multiplied by water velocity.

food webs - The system of predators and their prey that represent the complex feeding relationships in an ecosystem.

fragmentation - Alteration of natural patterns of landscapes or ecosystems, creating smaller patches or disrupting the continuity or connectivity of corridors and networks.

free carbonates - Carbonate materials that form coatings on soil that react with an acid to form carbon dioxide gas.

gage height - The height of the water surface above the gage datum (zero point). Gage height is often used interchangeably with the more general term, stage, although gage height is more appropriate when used with a gage reading.

gaging station - A site on a stream, lake, reservoir or other body of water where observations and hydrologic data are obtained. The U.S. Geological Survey measures stream discharge at gaging stations.

genetic diversity - Ultimate source of biodiversity at all levels. It is the material upon which agents of evolution act.

grain - the smallest unit of measurement used to characterize the landscape. Also sometimes called the 'minimum mapping unit.'

habitat fragmentation - The process by which a natural landscape is broken up into small parcels of natural ecosystems, isolated from one another in a matrix of lands dominated by human activities.

headwater(s) - 1) The source and upper reaches of a stream; also the upper reaches of a reservoir. 2) The water upstream from a structure or point on a stream. 3) The small streams that come together to form a river. Also may be thought of as any and all parts of a river basin except the mainstream river and main tributaries.

heterogeneity - Complexity or variation in physical structure (e.g., depth, velocity, substrate, wood, pool/riffle structure) of the landscape or site. Increased heterogeneity creates more types or greater variation in habitats for terrestrial and aquatic organisms.

horizon - An individual layer within the soil which has its own unique characteristics (such as color, structure, texture, or other properties) that make it different from the other layers in the soil profile.

hydraulic conductivity (K_{sat}) - A quantitative measure of how easily water and gas flow through soil. (Compare to ***infiltration*** and ***permeability***).

hydrologic cycle - The cyclic transfer of water vapor from the Earth's surface via evapotranspiration into the atmosphere, from the atmosphere via precipitation back to earth, and through runoff into streams, rivers, and lakes, and ultimately into the oceans.

illuviation - The deposit of materials from one horizon into another within the soil (such as clay or nutrients in solution).

in situ - Latin for the original position.

indicator of soil quality - An indirect measure of soil function. Indicators should be adequately sensitive to change, accurately reflect the functioning of the system, and be cost effective and relatively easy and practical to measure. Soil quality indicators are often divided into biological, chemical, and physical indicators.

infiltration - Flow of water from the land surface into the subsurface.

infiltration rate - The rate at which water can enter soil. (Compare to ***hydraulic conductivity***).

labile - Matter that is rapidly consumed or decomposed.

landscapes - Mosaics of terrestrial, aquatic, and marine ecosystems (unique communities and their physical environments) across regions, continents, or the Earth.

The ***landscape approach*** to managing collections of species focuses on landscape patterns rather than processes, and manages landscape elements in such as way to collectively influence groups of species in a desired direction.

leaching - The process by which soluble materials in the soil, such as salts, nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

lithosphere - The outer layer of soil and rock on a planet is called the "lithosphere" after the Greek word "lithos" meaning "stone."

litter - The covering over the soil in a forest made up of leaves, needles, twigs, branches, stems, and fruits from the surrounding trees.

matrix - The most connected and extensive landscape element type. It can include both human land-uses and vegetation communities.

mesotrophic - A system with low nutrient supply and low rates of primary production.

metapopulation - A population existing as a number of spatially discrete populations distributed among habitat fragments and connected via dispersal. A *source* is a discrete population where productivity exceeds mortality; a self-sustaining population. A *sink* is a discrete population

where productivity is less than mortality; is not sustainable without immigration of individuals from other populations. The *rescue effect* is when source populations bolster sink populations through dispersing individuals.

minimum data set (MDS) - The smallest set of soil properties that can be used to characterize or measure soil quality. The MDS will vary based on the intended land use, soil type, and climate.

molar ratio - The mass of substance divided by its atomic weight.

monitoring soil quality - Tracking trends in the functional status of the soil to determine the success of management practices or the need for additional management changes. Monitoring involves the orderly collection, analysis, and interpretation of data from the same locations over time. (compare to ***assessing***.)

mosaic - A collection of patches, none of which are dominant enough to be interconnected throughout the landscape.

movement corridors - Linear strips of natural ecosystems connecting areas with conservation value.

natural - Landscapes responding to environmental processes that have minimal impacts from technology-based human interventions or decisions (recognizing that humans are a characteristic of the environment/landscapes). Landscapes that are altered by humans in ways that mimic nature. A state of wildness.

nephelometric turbidity unit (NTU) - Unit of measure for the turbidity of water. Essentially, a measure of the cloudiness of water as measured by a nephelometer. Turbidity is based on the amount of light that is reflected off particles in the water.

non-point source (NPS) pollution - Pollution discharged over a wide land area, not from one specific location. These are forms of diffuse pollution caused by sediment, nutrients, organic and toxic substances originating from land-use activities, which are carried to lakes and streams by surface runoff. Non-point source pollution is contamination that occurs when rainwater, snowmelt, or irrigation washes off plowed fields, city streets, or suburban backyards. As this runoff moves across the land surface, it picks up soil particles and pollutants, such as nutrients and pesticides.

non-renewable natural resources - Features such as oil, gas and coal that once they have been used are not replenished in human lifetimes.

nutrient spiraling - A concept that acknowledges the directional transport of nutrients in streams and rivers, rather than closed nutrient cycles often assumed in terrestrial ecosystems.

nutrient spiraling distance - The distance traveled by the average atom, molecule, or particle in one complete cycle. Includes distance traveled in water (Sw), particle, (Sp), or consumer (Sc).

oligotrophic - A system with low nutrient supply and low rates of primary production.

organic matter - Any material that is part of or originated from living organisms.

soil organic matter (SOM) - The total organic matter in the soil. It can be divided into three general pools: living biomass of microorganisms, fresh and partially decomposed residues, and the well-decomposed and highly stable organic material. Surface litter is generally not included as part of soil organic matter.

active fraction - The highly-dynamic portion of soil organic matter readily available to soil organisms. May also include the living biomass.

humus - Usually a synonym for all soil organic matter, but is sometimes a synonym for stabilized organic matter.

labile organic matter - Organic matter that is available to microorganisms and is easily decomposed.

particulate organic matter (POM) or ***light fraction (LF)*** - The larger (POM) or lighter (LF) components of soil organic matter. They can be separated from soil by sieving (POM) or centrifugation (LF). This low-density organic matter is thought to represent the active fraction of soil organic matter.

stabilized organic matter - The pool of soil organic matter that is resistant to biological degradation because it is either physically or chemically inaccessible to microbial activity. These compounds are created through a combination of biological activity and chemical reactions in the soil.

particle size - The diameter, in millimeters, of suspended sediment or bed material. Particle-size classifications are:
[1] Clay—0.00024-0.004 millimeters (mm);
[2] Silt—0.004-0.062 mm;
[3] Sand—0.062-2.0 mm; and
[4] Gravel—2.0-64.0 mm.

patch - A nonlinear area that is less abundant than, and different from the landscape matrix.

peak flow - The maximum instantaneous discharge of a stream or river at a given location. It usually occurs at or near the time of maximum stage.

ped - An individual unit of natural soil structure or aggregation (such as granular, blocky, columnar, prismatic, or platy).

pedogenesis - The formation of soil profiles depending on the five soil-forming factors (climate, parent material, topography, organisms, and time) to create the pedosphere.

pedosphere - The thin outer layer of the Earth which is made up of soil. The pedosphere acts as an integrator between the atmosphere, biosphere, lithosphere, and hydrosphere of the Earth.

percolation - 1) The movement of water through the openings in rock or soil. 2) The entrance of a portion of the streamflow into the channel materials to contribute to ground water replenishment.

perforation - Where human uses (e.g., houses, oil wells, campgrounds) alter small areas within an area of natural vegetation.

permeability - The qualitative estimate of the ease with which fluids or gases can flow through soil.

perturbation - A departure from the normal state, behavior, or trajectory of an ecosystem; alteration of ecosystem processes as a result of human actions, such as land use.

petroglyph - A drawing on rock.

point-source pollution - Water pollution coming from a single point, such as a sewage-outflow pipe.

population - A group of interbreeding plants or animals within a species.

porosity - A measure of the water-bearing capacity of subsurface rock. With respect to water movement, it is not just the total magnitude of porosity that is important, but the size of the voids and the extent to which they are interconnected, as the pores in a formation may be open, or interconnected, or closed and isolated. For example, clay may have a very high porosity with respect to potential water content, but it constitutes a poor medium as an aquifer because the pores are usually so small.

primary producers - Organisms that can store energy through the process of photosynthesis.

quality of life - One's perceptions and assessments of wants and needs and how one views their place within landscapes and communities.

rating curve - A drawn curve showing the relation between gage height and discharge of a stream at a given gaging station.

recharge - Water added to an aquifer. For instance, rainfall that seeps into the ground.

recreation - Participation on lands where one receives emotional and physical value.

Redfield ratio (N/P) - Molar ratio of nitrogen to phosphorus. Usually based on forms of N and P used by photosynthetic plants (i.e., nitrate, ammonium, inorganic phosphorus). Ratios greater than 15-30 are considered phosphorus limited and ratios less than 15-30 are considered nitrogen limited.

reference soil condition - The condition of the soil on which quality is based or judged. Soil quality is usually assessed by comparing a soil to a reference condition. The reference condition

may be data from a comparable benchmark soil, baseline measurements taken previously on the same soil, or measurements from a similar soil under undisturbed vegetation, or under similar management.

refractory - Matter that is slowly consumed or decomposed.

renewable natural resources - Features such as plants and wildlife that can be used and are replaced through reproduction.

retention - The uptake and storage of dissolved nutrients or particulate matter by both abiotic and biotic processes.

return flow - 1) That part of a diverted flow that is not consumptively used and returned to its original source or another body of water. 2) Drainage water from irrigated farmlands that reenters the water system to be used further downstream.

return interval **-** The frequency at which a disturbance is expected to occur.

revetment - Bank hardening structure installed to help prevent the erosion of stream banks or deflect currents away from stream banks (e.g., riprap, wing jetties, stream barbs). Such structures are designed to protect streamside property by altering natural processes of erosion and deposition. As a result, aquatic communities and ecological processes are changed.

riparian water rights - The rights of an owner whose land abuts water. They differ from state to state and often depend on whether the water is a river, lake, or ocean. The doctrine of riparian rights is an old one, having its origins in English common law. Specifically, persons who own land adjacent to a stream have the right to make reasonable use of the stream. Riparian users of a stream share the streamflow among themselves, and the concept of priority of use (Prior Appropriation Doctrine) is not applicable. Riparian rights cannot be sold or transferred for use on nonriparian land.

river continuum concept - The continuum of stream ecosystem properties from small streams to large rivers based on predictable changes in the physical environment and contribution of nutrients and food resources from adjacent terrestrial ecosystems.

river dynamics **-** Changes in river channels and discharges through geomorphic and hydrologic processes that shape channels and determine streamflow.

runoff - 1) That part of the precipitation, snow melt, or irrigation water that appears in uncontrolled surface streams, rivers, drains or sewers. Runoff may be classified according to speed of appearance after rainfall or melting snow as direct runoff or base runoff, and according to source as surface runoff, storm interflow, or ground-water runoff. 2) The total discharge described in (1), above, during a specified period of time. 3) Also defined as the depth to which a drainage area would be covered if all of the runoff for a given period of time were uniformly distributed over it.

scraper - Organisms that consume their food by scraping across a surface. These animals often have blade-like mandibles or file-like radulas.

shredder - Organisms that consume their food by tearing large particles into smaller particles before consuming their food. These animals often have large mandibles for tearing particles.

slake test - A measure of disintegration of soil structure when exposed to rapid wetting.

soil function - A role or task that soil performs, especially: 1) sustaining biological activity, diversity, and productivity; 2) regulating and partitioning water and solute flow; 3) filtering, buffering, degrading, and detoxifying potential pollutants; 4) storing and cycling nutrients; and 5) providing support for buildings and other structures and to protect archaeological treasures.

soil profile - The "face" of a soil when it has been cut vertically that shows the individual horizons and soil properties with depth.

soil quality - In short, the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation. There are two aspects of the definition: inherent soil quality and dynamic soil quality.

> ***dynamic soil quality*** - That aspect of soil quality relating to soil properties that change as a result of soil use and management.
>
> ***inherent soil quality*** - That aspect of soil quality relating to a soil's natural composition and properties as influenced by the factors and processes of soil formation.

soil resilience - The capacity of a soil to recover its soil functions after a disturbance. Examples of disturbances are fire, flooding, tillage, or trampling by grazing cattle.

soil resistance - The capacity of the soil to maintain soil functions through a disturbance.

soil respiration - The amount of carbon dioxide given off by living organisms and roots in the soil.

soil structure - The shape of soil units (peds) that occur naturally in a soil horizon. Some possible soil structures are granular, blocky, prismatic, columnar, or platy. Soils can also be structureless if they do not form into peds. In this case, they may be a consolidated mass (massive) or stay as individual particles (single-grained).

solute - A substance that is dissolved in another substance, thus forming a solution.

solution - A mixture of a solvent and a solute. In some solutions, such as sugar water, the substances mix so thoroughly that the solute cannot be seen. But in other solutions, such as water mixed with dye, the solution is visibly changed.

spatially explicit data - Information or data that are specifically related to geographic position within the landscape (e.g., maps, geo-referenced data).

species - A group of actually or potentially interbreeding populations that are reproductively isolated from all other kinds of organisms.

The ***species approach*** to managing communities focuses on manipulating a single species that affects many other species. Species chosen might be an invasive species, a keystone species, or any species that has important ecological interactions that other species depend on or are affected by.

species richness - The total number of species, plants or animals or both, in an area.

specific conductance - A measure of the ability of water to conduct an electrical current as measured using a 1-cm cell and expressed in units of electrical conductance, i.e., Siemens per centimeter at 25 degrees Celsius. Specific conductance can be used for approximating the total dissolved solids content of water by testing its capacity to carry an electrical current.

stewardship - The individual's responsibility to manage land and life with regard to other landscapes and people in the short-term and long-term.

streamflow - The water discharge that occurs in a natural channel. A more general term than runoff, streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

structural diversity - The variety of horizontal and vertical physical element of the vegetation.

suspended-sediment concentration - The ratio of the mass of dry sediment in a water-sediment mixture to the mass of the water-sediment mixture. Typically expressed in milligrams of dry sediment per liter of water-sediment mixture.

sustainability - The ability of landscapes and communities to renew themselves indefinitely.

tilth - The overall physical character of soil with regard to its suitability for crop production.

trajectory of change - Change in landscape patterns over time, especially as these are modified by people.

tributary junction - The confluence of a stream entering a mainstem stream or river channel.

trophic cascading - Transfer of energy through the trophic levels of an ecosystem. Top down effects reflect the influence of strong predation down through a food web to lower trophic levels. Bottom up effects reflect the contribution of nutrients or food resource from lower trophic levels to higher trophic levels.

trophic structure - Classification of organisms based on what they consume and thus their position in a food web or food chain.

turbidity - The amount of solid particles.

uptake - The longitudinal retention of nutrients by abiotic and biotic processes. Uptake equals the standing stock of nutrients multiplied by the instantaneous uptake rate.

use-dependent properties - Soil properties that change in response to use and management of the soil. These include soil organic matter levels and aggregate stability.

use-invariant properties - Soil properties that change little if at all among different land uses. They include mineralogy, texture, and depth to bedrock.

value - Worth that could be expressed in intrinsic, economic, spiritual, and other terms.

visualization - Computer-based techniques for depicting landscapes in ground level and aerial views to help lay audiences comprehend future land and water use options.